Work package 2- Historical and recent attitude of stakeholders

Case 7 + 8:
Västerås Biogas Plant
and
Lund Biogas Plant

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*C*ultural Influences on *R*enewable *E*nergy *A*cceptance and *T*ools for the development of communication strategies to promot*E* ACCEPTANCE among key actor groups

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1. Introduction

This case study deals with early experiences in the deployment of biogas plants in Sweden - i.e., the adoption on a large scale of a fairly established technology, which however has encountered a number of issues in large-scale implementation. In Sweden, the production of fuels and fertilisers from biogas featured as a part of the country's visions for an Eco-Cycle society. It has thus been expected to solve waste management, nutrient recycling and energy problems at the same time. More recently, biogas has gained importance as a CO_2-neutral, and sometimes even local, automotive fuel. Yet some aspects of the technology have also been controversial in Sweden. This case study deals with two cases reported in earlier research (Khan, 2004a; 2004b; 2005), which illustrate issues in social acceptance that contributed to success and failure of the local deployment of renewable energy technologies. The case study is largely based on published research, which has been complemented by documentary data produced by the project managers. The author of the original research, Dr Jamil Khan of Lund University, has also kindly reviewed this case study and provided some comments.

2. Country overview: biogas in the Swedish context

There is a long-standing policy commitment to renewable energy in Sweden, even though the driving forces for this policy have changed over time. After the oil crises, the main focus of the policy was to secure the energy supply through an increase of domestic energy sources. From the mid-1970s to the mid-1980s, there was a rapid expansion of nuclear power, but resistance to nuclear power grew at the same time, culminating in a referendum in 1980 and a decision by Parliament to phase out nuclear power. This was a key event for renewable energy, even though some of the original decisions about the phase-out have been subsequently revoked (Nilsson et al., 2004).

There is a long tradition of public funding for research, development and demonstration of renewable energy in Sweden. Per capita spending has been relatively high for the past three decades. Energy taxes have also contributed significantly to the development of renewable energy: oil taxes in the 1980s, a carbon tax introduced as early as 1991, and an energy tax for other than electricity production. The exemption of biomass from the energy taxes contributed to the growing popularity of biomass use, especially in district heating, during the 1990s (Nilsson et al., 2004).

Public discourse about the environment and other societal problems is an established part of the Swedish culture. Successive governments have launched high-profile programmes to solve environmental problems. In addition, municipalities, NGOs, citizens and even corporations are engaged in a wide range of programmes to solve environmental problems. In this same vein, popular opinion is quite positive about renewable energy and energy conservation. For example, there has been a significant increase in the consumption of green electricity in Sweden, which doubled to 9% between 1999 and 2001 (Ek, 2005). Sixty per cent of the population also strongly support energy conservation (Viklund, 2004). Even though general attitudes have become increasingly accepting of continued use of nuclear power in recent years, Swedes are still relatively negative toward nuclear power (Viklund, 2004). Solar power, wind power and hydropower are the preferred sources of energy. Perhaps somewhat surprisingly, bioenergy has not been equally popular, being rated better than fossil fuels, but clearly worse than wind and solar power both as a source of electricity (Ek, 2005) and as an energy source in general (Viklund, 2004).

Nonetheless, the use of biomass in Sweden grew by 88% between 1980 and 2002 (Johansson, 2004). This record growth is a result of four factors (McCormick, 2005): available natural resources and competences, demand for heat in the district heating system, the carbon tax and local and regional initiatives. In terms of resources and competences, Sweden has developed a quite significant export industry in bioenergy conversion technologies. McCormick (2005) also stresses the role of local and regional initiatives to combat climate change, such as a social movement called Fossil Fuel Free Communities. Such initiatives have also actively sought for synergies with other sectors, such as waste management, forestry and agriculture, and partnerships among local communities. - I do believe that person has made a political statement that he will govern the country towards a fossil free economy by 2020 … There should be a media story on this.

As oil prices have peaked, there has been growing interest to increase the share of biofuels in the transport sector. This is promoted, e.g., by tax reliefs for biofuels and flexible-fuel vehicles, technology procurement programs, specifications for government vehicles and local initiatives such as exemptions from congestion taxes. The most widely-used used biofuels are bioethanol, rape methyl ester (RME) and biogas, and imports of ethanol have in fact increased sharply in recent years (Ministry of Industry, Employment and Communications, 2004). The government has recently launched an ambitious plan to break dependence on oil by 2020, in which alternative (and preferably local) transport fuels feature prominently (Commission on Oil Independence, 2006).

Biogas as a solution to multiple problems

The technology for producing biogas through the anaerobic digestion of organic waste has been known since the mid-19th century. Since the oil crises, it gained interest in Sweden as a form of energy production, and as a potential alternative to oil. A number of plants were constructed at wastewater treatment plants and landfill sites (Svenska biogasförening, 2006). Since the mid-1990s, the interest in building designated biogas plants increased, with the aim to enhance energy supply and promote environmental improvements in waste management. In 1996, the Swedish Environmental Protection Agency published an Action Plan for Waste, proposing a ban on landfilling of organic waste by the year 2005. There was also a growing interest in using residues from anaerobic digestion for soil improvement. Taxes on CO_2 and proposed additional taxes on nitrogen oxide emissions were expected to increase the market value of biogas as a motor fuel (Thyselius, 1999).

In the late 1990s, the rate of implementation picked up: tens of municipalities were granted support for constructing biogas plants under the government programme for sustainable development (Thyselius, 1999). Although biogas production was by then a fairly established technology, large-scale co-digestion of different kinds of organic matter was still fairly new. Different plants employed different technologies, and much research was ongoing to optimise processes. The sector was (and remains) fairly dependent on financial support from the state, and most biogas plants have been largely financed by municipally-owned waste companies making use of state grants (Khan, 2004a).

Biogas plants can involve and combine a number of interests: waste management, energy production, automotive fuel production and agricultural land improvement. In spite of the widespread enthusiasm, biogas production has also involved some controversies. One set of problems relates to the utilisation of digested waste as a fertiliser. Reintroduced in 1996 as one key element of the Ecocycle Society, nutrient recycling has encountered quite significant opposition by some consumers, farmers and environmental organisations due to concerns about heavy metal build-up and the spread of pathogens (Bengtsson and Tillman, 2004). This has created additional economic uncertainties for biogas plants. Another set of problems relates to the local impacts of biogas plants. The issue of odour is the most common concern of local residents, and has in some cases contributed to local opposition (Khan, 2004a).

In recent years, interest in biogas has gained momentum in Sweden. Biogas-powered vehicles are used in the public transport system in a number of towns. The network of fuelling stations for ordinary consumers is also growing, especially in the south of Sweden (Svensk Biogas, 2006). The most recent developments include the planned construction of a huge biogas plant, as well as the introduction of a biogas-powered train (Olofsson, 2005). Biogas is viewed by many as a transitional fuel on the path to a hydrogen-fuelled transport system (Dagens Miljö, 2006) or simply the fuel type which Sweden will take up along with ethanol made from biological waste.

3. Summary: two different cases of siting biogas plants in Sweden

A set of studies by Khan (2004a; 2004b; 2005) have analysed issues in project management, public participation and local planning conflicts in Swedish biogas and wind power projects. Even though the biogas projects were less frequently controversial on the local level than the wind power projects, this case study will focus on analysing lessons from two of the biogas projects, located in Västerås and Lund, which are both mid-sized towns, one in the south of Sweden, one about 100 km inland from the capital, Stockholm. These studies bring up some interesting aspects of the mobilisation of support or resistance to early large-scale biogas deployment.

Västerås

The biogas project was jointly initiated by three different partners. Local farmers were investigating options to grow ley crops for soil improvement (i.e., crop rotation crops for fallow periods), and the possibility of a biogas plant to digest the crops. The regional waste company was investigating alternative forms of biological waste treatment for organic household waste, and had instituted a system for source separation of organic household waste some years earlier (Khan, 2005). The third partner was the municipal energy company. A joint project was started in 1995 for a plant that would digest ley crops and organic household waste and produce biogas. The regional waste company was responsible for the project management, and provided most of the expertise for the project. The local farmers were important as customers of the waste processing capacity of the plant, and the energy company planned to take responsibility for the distribution and sale of biogas (Khan, 2005).

The project was managed cooperatively by a working group involving all key partners. Together, the partners solved a number of problems encountered in siting, use of the products of the plant, the permitting process, and finally, the financing of the project. Yet Khan (2005) reports that there was no local opposition to the plant. This was partly due to the fact that the plant was located at an existing waste management site, and local residents were accustomed to such activities in their vicinity. The company had had complaints about odour before, but had gained the trust of local residents by dealing with them openly and cooperatively. The biogas plant was also presented as a solution to earlier problems caused by odour.

The biogas plant was opened in Summer 2005, and it will process annually about 14 000 tons of sorted organic household waste, about 4000 tons of fatty sludge and 5000 tons of ley crops. The plant includes a facility for upgrading the gas to automotive fuel quality, with an expected output corresponding to two million litres of petrol. A number of fuelling stations have been built to sell the gas produced (Växtkraft, 2006).

Lund

The project in Lund started out in two parallel planning processes: one by the regional sewage and water waste management company (SysAv Ab) and one by the municipality of Lund in 1995. SysAv Ab operates in nine municipalities in the south of Sweden, and the company

investigated a number of potential locations for the plant. When the ongoing interest in Lund was discovered, SysAv decided to locate the plant near a small village in Lund called Dalby. Starting in 1997, the project became a joint project, and planning continued in working groups managed by SysAv and the municipality of Lund (Khan, 2004b). Some stakeholders were involved in the planning (farmers' organisation and local energy company), but only ones with positive interest. Although the developers believed there was strong public support, neighbours started to protest when the permit application was filed. Opposition mounted, and residents lobbied politicians and authorities. In response to this public uproar, the Planning Committee decided to refuse a permit, and the project was stopped in 2000 (Khan, 2004a; 2004b).

Since Khan's (2004a; 2004b) studies, pressure to locate a biogas plant in Lund have re-emerged. For example, the region of Skåne, where Lund is located, has obtained a state grant to inform key groups about biogas, to set up local production facilities and fuelling stations, and to promote the use of biogas vehicles (Region Skåne, 2006). There are also pressures to increase the local production and distribution of biogas in Lund, voiced, for example, by NGOs (Aobadia, 2006; Lundabygdens Naturvårdsförening, 2006). In 2005, SYSAV set up a subsidiary for biological waste treatment, and is building a biogas facility in the nearby city of Malmö (Lunds kommun, 2006).

4. STEP ONE: Possible futures?

In both projects, the visions were fairly similar. The primary aim was to improve local waste management and extract useful resources from organic waste. Yet the production of energy (and later, vehicle fuel) was an important secondary aim, which has gained more and more importance over the years. Waste management companies are today expected not only to process waste, but to produce useful resources, and vehicle fuel is just about the most high-grade product one can make out of organic waste.

Linking resource recovery-oriented waste management with the local production of CO_2-neutral fuel (as well as natural soil improvement) was the main vision of both projects. Both visions were also linked, on a broader level, to the 'grand vision' of an Eco-Cycle Society[1] that conserves resources and recovers resources in (preferably local) cycles (see Figure 4.1). The idea of finding local synergies between different sectors was also clearly a part of the vision, and visible in how the projects were designed.

[1] Originally, the idea of an Eco-Cycle Society was launched in Sweden the 1980s by an organisation called The Natural Step. It gained an official status in the mid-1990s, when a national Commission for the Ecocycle Society was instituted. In May 2003, the Swedish Government put forward its bill *A Society with Non-Toxic and Resource-Efficient Ecocycles* (Government Bill 2002/03:117). The bill proposed objectives, strategies and measures to create such a society. The Bill highlights the resources contained in waste, and the need to utilise them more effectively.

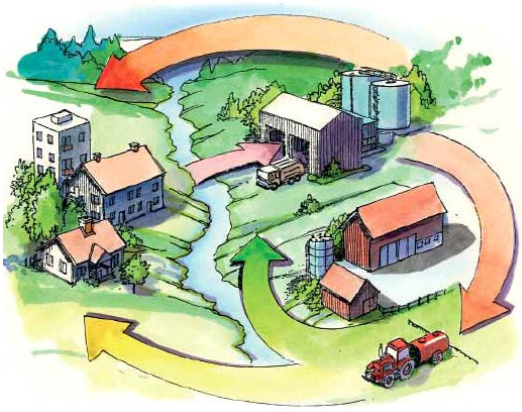

Figure 4.1 *Image from the information material produced by Växtkraft, the biogas plant operator in Västerås (www.vafab.se), linking the plant to a broader view of the Eco-Cycle Society*

5. STEP TWO: What were the various expectations of the cases?

Both projects involved multiple actors and expectations, which were basically quite similar in the two projects (Table 5.1). The intensity of these expectations, however, varied. In Västerås, the parties involved had strong interests linked to the project: it was an integral part of the farmers' plans to grow and digest ley crops, it was (and is) an important part of the modernised waste management system based on source separation and extraction of high-quality resources, and it has become increasingly important (at least symbolically) as a source of local CO_2-neutral transport fuel.

While similar expectations coloured the project in Lund, they were not equally intense (Khan, 2004a). The local farmers had not been active in the project from the start, even though they were prepared to deliver manure to the plant. The municipality of Lund, though, was very enthusiastic, and made efforts to ensure that the plant would be located in Lund. Yet the waste management system in Lund is based on large-scale incineration, and there were no immediate plans for sorting household waste - so the integration into the local waste management system was not so intense. The production of biogas was also not linked explicitly to the production of vehicle fuels, even though this was one of the alternative envisioned future uses of the biogas. Thus, in hindsight (Khan, 2004a) the local support was not as widespread or spontaneous as it was in Västerås.

Table 5.1 *Actors and expectations involved in the biogas projects in Västerås and Lund (differences highlighted in bold)*

Västerås	
Waste management company	Investigate alternative forms of biological waste treatment for household waste Improve environmental image Recover resources from waste Develop a new line of business
Municipality	Improve local environmental quality **Make use of separately collected household waste** Contribute to national aims
Local farmers	**Grow and digest ley crops for crop rotation** **Utilise digested material as fertiliser**
Energy company	Experiment with biogas production **First: use gas for district heating** **Later: upgrade gas to vehicle fuel quality**
Government (as grant provider)	Support local change processes toward sustainability Provide good examples for other municipalities Promote diffusion and further refinement of biogas technology
Environmental NGOs	Mildly in support Low level of engagement

Lund	
Waste management company	Investigate alternative forms of biological waste treatment for household waste Improve pro-environmental image Recover resources from waste Develop a new line of business
Municipality	Improve local environmental quality **Explore alternatives to large-scale incineration** Contribute to national aims
Local farmers	**Did not see the plant as an essential part of farm management** **Agreed to deliver manure to facility**
Energy company	Experiment with biogas production
Government (as grant provider)	Support local change processes toward sustainability Provide good examples for other municipalities Promote diffusion and further refinement of biogas technology
Environmental NGOs	Mildly in support Low level of engagement

Biogas was clearly propagated as an environmentally benign alternative at both sites. Yet environmental organisations were not strongly involved, and other spokesmen for the environment emerged. Most notably, a small group of local residents in Dalby emerged to speak for the local environment - e.g., the protected pond - and contest the competence and intentions of the developer as an agent for the environment.

The original expectations were obviously quite exploratory: different parties wanted to experiment with the technology that was becoming so popular, that promised to solve so many different problems, and for which hefty state grants were available.

6. STEP THREE: Understanding participatory decision-making: negotiating expectations

In terms of how the different expectations were negotiated, there are both similarities and differences between the projects (Table 6.1 and Table 6.2). Both projects basically involved the similar stakeholders and similar formal political and permitting processes. Yet the way these processes were played out was different, which resulted in a turn that led the projects on to different trajectories.

Both projects involved extensive planning in working groups including key stakeholders, i.e., partners of the project representing the different interests that the project served. These were expert groups with an advisory function that aimed to uncover areas of common interest and make use of a wide range of expertise to detail plans for implementing the project.

In Västerås, a designated working group with representatives of the different partners was set up and met regularly. The project developed a specific name for the biogas facility (Växtkraft, i.e., Plant Power in English), and was later incorporated as a separate company. According to Khan (2005), this group worked on the basis of mutual interdependency, and partners had both strong incentives and, as time passed, also personal bonds, creating loyalty to the project. The social mobilisation achieved by the project was quite important, as the project encountered a number of complex issues and unforeseen developments over the years: for extended periods of time, there was considerable uncertainty about key issues such as delayed decision-making on government funding, the location of the plant and the markets for biogas. For example, the original location of the project had to be abandoned, as the local energy company decided to build a district heating system in the area, which would undermine the possibility to sell the gas to households. This change of location also gave rise to the decision to upgrade the gas produced to vehicle fuel quality, and thus find a new market for the product. The project also made significant efforts to make sure that the digested waste would be approved for use as fertiliser (Khan, 2005).

According to Khan (2005), the political process surrounding the Västerås plant was relatively straightforward. All political parties and municipal authorities acknowledged the environmental benefits of the project, and supported it more or less actively at the main stages of the planning process. The only controversy involved costs, as the plant required a significant investment (13 million euros), half of which was obtained through a grant from the State. This led the political opposition in Västerås to argue against the project in the final stage, but it was approved by the majority in 2003. Other issues encountered were the permitting process, in which the authorities were scrupulous in avoiding problems of odour that had given rise to complaints at other locations. Hence, the waste management company was required to improve its plans for odour management and mitigation.

Negotiations with local residents were conducted earlier and more continually in Västerås than in Lund, and continuity with prior projects was established[2]. For all those involved, the project presented itself as a logical way to continue and improve existing activities, such as improved waste management or soil management, and also enhance them with new elements such as the production of vehicle fuel.

[2] It is worth noting, however, that the original research (Khan, 2005) did not include an in-depth study of the quality of resident participation in the Västerås case, as the focus in this case study was on project management. Thus, the data available are more limited than for the Lund case.

Table 6.1 *Forms of participation in the Västerås case*

Type	Organisers	Involvement	Purpose
Permanent working group of key stakeholders (1995-2003)	Managed by the waste management company as project manager	Waste mgmt company Local farmers	Explore synergies Develop project as cooperative effort Identify and deal with problems arising from the different linkages of the project Communicate about the project to external parties
Ongoing interaction with residents in the context of waste management	Municipality Waste management company	Local residents	Introduce source separation Manage landfill site Provide information on the waste mgmt system
Consultation with local residents	Waste management company	Local residents	Provide information about the project Gain feedback from residents
City council meetings	City council	Local politicians Local administrators as providers of information	Make decisions about investment in the plant
Permitting process	County administration Waste management company	Authorities	Determine environmental impacts of the facility Specify criteria that the facility must meet to be eligible for a permit

In the Lund project, as well, planning was conducted in working groups, dealing with issues such as the location of the plant, technology and markets, the use of biogas and cooperation with farmers. Some key stakeholders were involved in the planning (farmers' organisation and local energy company), but only ones with a positive interest. The purpose of the working groups was not to reach a consensus among all parties, but to deal with technical issues, although they also served as a means to disseminate information about the project and build up support. At this point, all parties involved were enthusiastic about the project, and it was perceived as bringing common benefits (Khan, 2004b). The focus of the work was on these benefits, and Khan (2004b) points out that there were no working groups on potentially controversial issues, such as environmental impacts or the location of the plant.

The residents of Dalby, the planned location, were informed of the project fairly late, although in line with legislative requirements. A consultation meeting (required by the permit application) was held in June 1998. Only close neighbours of the plant were invited, and not people actually living in the village of Dalby. The meeting was held just before the permit application was filed, and all technical details had been fixed at that point. The meeting was strictly informational, but many local participants had a large number of questions that could not be addressed. People also requested further meetings, but SysAv had not planned for such further consultation (Khan, 2004b). After the consultation meeting, local resistance toward the plant started to mobilise. Residents started writing letters to the local authorities criticising the plans. A small opposition group formed, consisting of both neighbours of the site and residents of the village. The opposition group was mainly composed of middle-class, middle-

aged people, predominantly men. They were very active, held door-to-door discussions with other residents, handed out flyers, circulated a petition and organised meetings. In this way, they managed to mobilise significant local support for their position (Khan, 2004b).

The local residents' main concerns related to odour, increased traffic, landscape effects and concern about impacts on a nearby protected pond area. But there was also a perceived credibility gap: the first consultation meeting had shown off the company as uncaring and uninformed about local conditions, and this impression was difficult to correct. The developer tried to counter by organising local meetings, but at this point, its actions were no longer perceived as credible (Khan, 2004b). Khan (2004b) has carefully analysed the nature of the conflict and concluded that there were genuine issues of incompatible interests or fundamental uncertainty about the projects' effects, but also aspects of communication breakdown and polarisation of the controversy.

As local resistance mounted, the support for the project among the municipal administration and politicians dissolved. In January 2000, the political majority of the local Planning Committee decided not to allow a detailed plan to be made, and thus put a stop to the project (Khan, 2004b). Khan (2004b) has noted that, interestingly, the local resistance to the plant came as a full surprise to the developer. SysAv Ab had believed the planning process to be open and inclusive. They were also surprised as the resistance spread into the local administration, and the support they had built up for the project dissolved.

The roles of the stakeholders changed as the project evolved. Originally, the project had widespread support within the municipal administration, as well as by some active local politicians. In response to the local resistance, this support broke down fairly rapidly. The Planning Office decided that a detailed plan of the site was needed in order to award a building permit, and the Planning Committee decided to refuse the application for such a plan. In parallel, the County Administration, responsible for the environmental permit, decided to request further information (including more consultation with locals), but this process was never carried through as local political support was withdrawn. Local residents were first curious and undecided, but rapidly turned into opponents of the plant. Interestingly, environmental organisations remained non-committant throughout the process: they were basically in support of biogas plants, but did see a genuine problem in the location of the plant (Khan, 2004b).

Table 6.2 *Forms of participation in the Lund case*

Type	Organisers	Involvement	Purpose
Long-standing working groups of experts and key stakeholders (1995-2000)	Managed by the waste management company as project manager	Administrators from different municipal departments Local farmers Energy company	Investigate synergies and benefits of the project
Consultation with local residents	Waste management company	Neighbouring households	Inform neighbours and fulfil permit requirements
Public meetings	Local activists	Neighbouring households + village residents	Rally support in the community
Door-to-door lobbying	Local activists	Neighbouring households + village residents	Rally support in the community
Protest letters	Local activists	Neighbouring households + village residents	Alert local politicians and authorities to problems
Media articles	Local activists		Raise discussion on the planned facility
Permitting process	Planning Comittee County Administration	Civil servants Elected officials Waste management company Lobbying by local residents	Determine need for detailed plan Determine environmental impacts Specify criteria for eligibility for an environmental permit

Khan's (2004a; 2005) studies highlight the importance of *informal negotiation processes* both in positive and negative terms. An example of a positively-contributing informal negotiation process can be found in the Västerås case: the extensive planning process, which lasted eight years, served to forge informal, personal relations among members of the working groups. These relations served to increase the commitment of participants in the process, and to help the project survive longstanding uncertainties and unexpected setbacks. In contrast, in the Lund case, the informal negotiation process that started as the local residents became involved underlines the power of local citizen groups. With very limited resources and very low-tech media (e.g. door-to-door discussions, Xeroxed flyers) they were able to mobilise support for the resistance movement and totally discredit the developer.

There were also some more formal stages of negotiation in the process. These included stages in the political process and stages in the permitting process. The projects were processes by a great number of local authorities, e.g., environmental and planning authorities, and they led to votes in various municipal decision-making bodies (municipal council, planning committee). Another formal type of negotiation arena is the permitting process. In Sweden, facilities like the biogas plants are required to obtain an environmental permit and a building permit. The environmental permit is issued by regional authorities and the building permit by local authorities. While such processes involve a number of set criteria (such as required consultations and environmental impact statements), news and debates in the local press can also influence the process (Khan, 2004a).

These informal processes had an impact on how formal processes were played out. The informal support that had built up for the Västerås project was able to influence the vote in the

local council (in spite of financial concerns raided by the political opposition), whereas the informal resistance in the Lund case was decisive for the actions of municipal authorities and politicians that finally put a stop to the project.

The extensive planning conducted in the working groups served as a forum for the *alignment* of the different interests of farmers, waste management and energy production. In the Västerås case, there was also some level of alignment with local residents' interests, even though this was more in terms of one-way communication and long-term engagement in activities such as source separation, responsible landfill management etc. In Lund, the misalignment with local residents' interests, however, turned out to be a decisive problem for the project. There were no serious attempts at alignment, and when some tentative attempts to organise meetings were finally made, they were much too late to save the day.

7. STEP FOUR: From visions to actualities

The *visions were translated into actions* in a long and winding process. This process was lengthy in both cases, but only one of them managed to mobilise sufficiently strong support to carry the project through. Thus, Västerås today has a biogas plant that features as a positive flagship of the waste management company, whereas there is no large-scale biogas plant in Lund.

In the Västerås case, the initial objectives of the vision were *adapted* at many stages. For example, the initial location was changed, and serendipitously, a new and more interesting application for the fuel was found (Khan, 2005). The project was clearly more capable of communicating with multiple agendas and providing each something positive.

Resistance by residents was the decisive event for the Lund case, since prior support for the project dissolved after this point (Khan, 2004a). In Västerås, the project had managed to offer all parties at least a small improvement in their earlier situation, but in Lund, the neighbours mobilised to resist plans that they perceived would make their situation worse.

In these cases, *key lessons of the transition process* seem to relate to flexibility, social embeddedness and awareness of different stakeholders' needs. Khan (2005) has stressed the flexibility and adaptability of the Västerås project, which in turn he relates to the commitment forged among key partners in the project. He also argues that success hinged on the ability of the project to connect to broader ongoing change processes - such as the local farmers' aims and the previously introduced system for organic waste separation. The project thus served as a logical way to connect many different existing agendas.

It is also interesting to note that the project managers in Lund were taken by surprise by the local resistance - they had believed they were managing an inclusive and open planning process. They also believed they were interacting with a broad range of local stakeholders, and understood the local position on the facility. Yet they failed to see the diversity present in the local context. The managers had only communicated with positively-oriented people in (the city of) Lund, and failed to realise that there might be different opinions in 'the other Lund' (the village of Dalby).

8. Lessons learned

Siting conflicts are obviously tied to a specific location, so they will quite naturally highlight the importance of understanding the *local context*. These cases, however, also outline some of

the links between project management and local context that can promote or obstruct such understanding.

1. *Early anticipation of problems:* At the face of it, one could argue that the first project succeeded because it was located at a site that had been previously used for waste management, while the Lund project failed because the project manager attempted to locate it at a pristine site. The close link between biogas and waste processing obviously makes the technology especially vulnerable to siting controversies. But Khan's (2004b) analysis shows that both projects encountered siting uncertainties, but siting issues were examined more critically at an early stage in Västerås.
2. *Importance of engaging diverse stakeholders to give early alert about problems.* Another clear difference is in the relations to the local community and to ongoing change processes. In the Västerås project, the broad range of stakeholders involved obviously helped to alert the project managers to potential problems early on, and thus enable preventive action. This is highlighted by the contrast to the Lund case, in which local resistance came as a total surprise.
3. *Management of the public participation process:* The role of social acceptance in this case study is obvious. A very small group of local residents - not linked to any established environmental movement - were capable of putting a stop to the project in Lund. The project manager had not been able to anticipate this resistance, and thus mis-managed the public participation process totally. In this aspect, the Lund case serves as a 'textbook example' of the importance of open communication and early participation.
4. *Role of commitment by project partners in surmounting obstacles*: But there are also other aspects of project management that are relevant to the cases. Khan (2004b) stresses flexibility and the willingness to adapt existing plans as important. This can partly be attributed to more or less skilful project management, but partly also to the level of commitment achieved among key stakeholders, i.e., project partners. The successful project involved a broader range of stakeholders, and they were engaged more intensively. Thus, the Västerås project managed to anchor itself better to multiple agendas. This served as a buffer that helped the project prevail even in the face of uncertainties and setbacks. The strong coalition that emerged was able to find solutions to problems, and build up public support for the project. Flexibility and endurance are thus highlighted as good qualities in project management.
5. *Importance of prior experience for building up local trust.* The cases implicitly highlight the role of historical continuity and prior experiences of trustworthy behaviour. In both cases, project managers were familiar to the local residents. In one case, there also was a history of honest dealings with local people, which contributed positively to trust. For project managers previously present in the region, history can be either an asset or a liability.
6. *Synergies and competition beyond the energy sector:* For the successful project, there were some initial synergies with other interests and ongoing change processes. These included the interests of the local farmers to change their agricultural practices, as well as the source separation of household waste that had been instituted earlier in the locality. In contrast, in the unsuccessful project the municipality had a sunk investment in a municipal waste incinerator, although it was interested in experimenting with alternative solutions. Yet source separation of organic waste had not been instituted, and thus the biogas plant had less immediate relevance for local residents.
7. *The role of future landscape and regime-level developments.* At the time of the projects, the general interest in biogas technology was not as obvious as it is today. It had captured the interest of experts, but was not well known to the public. Biogas fuelling stations for ordinary consumers did not exist - yet they are the key media interest today in Sweden. Obviously, the project managers had some insights about the future, but they were not always able to articulate them convincingly enough.

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